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ARTIFICIAL AURORÆ.

PROBABLY most of our readers have somewhere or other, at the defunct Polytechnic, if nowhere else, seen the beautiful imitation of aurora produced by an electric discharge through an exhausted tube. It is, however, to a far more remarkable experiment that we desire now to draw attention, but as at present we have nothing but telegrams and hearsay remarks, we purpose merely reproducing a few paragraphs respecting the experiments, and leaving them to speak for themselves.—ED.

AN ARTIFICIAL AURORA.—A telegram has been received by the Finnish Academy of Sciences from Professor S. Lemström, chief of the Finnish Meteorological Observatory at Sodankylä. He states that, having placed a galvanic battery, with conductors covering an area of 900 square metres on the hill of Oratunturi, he found the cone to be generally surrounded by a halo, yellow-white in colour, which faintly but perfectly yields the spectrum of the aurora borealis. This, he states, furnishes a direct proof of the electrical nature of the aurora, and opens a new field in the study of the physical condition of the earth. A further telegram has been received, in which Professor Lemström states that experiments with the aurora borealis made December 29, in Enare, near Kultala, on the hill of Pietarintunturi, confirm the results of those at Oratunturi. On that date a straight beam of aurora was seen over the galvanic apparatus. It also appears from the magnetic observations that the terrestrial current ceases below the auroral arc, while the atmospheric current rapidly increases, but depends on the area of the galvanic apparatus to which it seems to be proportional. The Professor regrets that with the means at his disposal further experiments cannot be made, and that he intended, on the 13th ult. (January) to withdraw the apparatus.—*Public Opinion*, Feb. 10.

SCIENTIFIC EXPERIMENTS IN HIGH LATITUDES.

The Electro-Technical Association has telegraphed to Professor Lemström, at Helsingfors, congratulating him on his important investigation of Polar lights, and expressing a warm interest in his further experiments. M. Lemström commenced his research in Spitzbergen, where he observed rays of Polar light at a lower elevation than the clouds. He had later produced similar phenomena on a small scale in his laboratory. The mountains upon which he made his last experiments were conical, and respectively 800 metres (2,625 ft.) and 1,100 metres (3,609 ft.) high. The copper framework was erected between two and three metres above the mountain-top, isolated in the usual way and conducted to the bottom of the hill by means of an insulated wire. The latter was connected with the damp subsoil by a zinc plate. The copper framework terminated in hundreds of metal points. No sooner was the wire connected

with the earth than positive currents were remarked, and a white light was observed above the metal points which, subjected to the spectroscope, distinctly showed the well-known line of the aurora borealis. Unfortunately the ice crystallised so rapidly around the wire as to damage and break it by its weight. There was full time, however, to observe the formation of a ray of Polar light about 120 metres (394 ft.) in length—*Daily Telegraph*, March 2nd.

An Artificial Aurora.

Since Franklin's famous experiment, by which he proved that a flash of lightning is only a long electric spark darting from the battery of the clouds, nothing has been done to test the nature of atmospheric electricity so praiseworthy or so interesting as the investigation by Professor Lemström described in the telegrams of our Berlin correspondent. For many years physicists have had little doubt that the Aurora Borealis was an electrical phenomenon. When a strong current is passed through a partially exhausted glass cylinder—the enclosed air of which would fairly represent the thin upper atmosphere—a soft, bright, tremulous, and variously-coloured light streams through it, for all the world like a miniature of the "Merry Dancers" of sub-polar skies. Besides this, there is the well-known fact that when the Northern Lights are visible, telegraphic indications are sadly deranged by earth-currents. This is now recognised as a constant and nearly if not quite universal phenomenon. On November 17th last, during a brilliant display of aurora, the magnetic recording instruments at Greenwich were more perturbed than they had been for years past, and it was then noticed in *The Daily Telegraph* that simultaneously a magnetic storm had raged over a large part of the Northern Hemisphere. Almost the only doubt that was felt as to the real character of the Polar Lights arose from the fact that Sir George Nares and his companions, wintering in the Arctic seas, and seeing many of these displays, came to the conclusion that they were "in no way connected with electrical or magnetic disturbances." But this impression can easily be accounted for by a curious fact, which Sir George Nares and his fellow-voyagers brought to light—namely, that the ice in those high latitudes, owing to excessive cold, possesses such exceedingly low conductivity as to approach almost to the character of glass. Hence the earth-currents would be deep beneath the ice. Strangely enough, at Greenwich Observatory, while the magnetic instruments are strongly agitated, the surrounding air shows no sign of electrical disturbance.

Professor Lemström has put the question to the test of experiment and received a decisive answer. At a point in North Finland, just within the Arctic circle, the professor constructed a network of wire on two conical mountains, which were respectively about 2,600 feet and 3,600 feet high. Hills of this shape were chosen because, as is well-known, electricity gathers most readily about sharp eminences. If mankind possessed an electro-static sense, and could perceive electricity as they can light, then we should see this now mysterious agency everywhere diffused in the world, and from all the edges, corners, and sharp points of rocks and hills, and church spires, and even the tips of the leaves of plants and trees, we should observe unceasingly at work day and night electric streamers keeping up the balance of Nature. Nothing in the visible universe is more grand or more varied as scenery than in all probability would be the aspect of the universe which such a sense would afford. It is now known beyond question that every species of motion, every change of temperature, every mode of friction, however slight, between any two dis-similar substances—though they be mere atoms in size—the daily course of the sun round the earth, the tidal strain which the moon exerts on the sea and on the solid crust of the globe, as well as every chemical combination, produces or is accompanied by electrical disturbance. The professor knew, therefore, that to and from these hill-tops electricity was darting; by experiment he determined to hasten the process and to render it visible. Copper wire being an admirable conductor, he connected the summits of the hills with the earth at their base by a network of this material, and the result was, as stated

in our telegrams, that instantly an arch of the aurora was formed overhead rising, it was estimated, to some 360 feet above the mountain top. This was a considerable distance at which to produce an artificial arch of light; but we have to remember that it is produced naturally hundreds of days every year in the same latitudes, near to the earth's magnetic pole, and the professor merely educed the radiant bow by giving assistance to natural forces. It was an echo to the positive currents of his wires. As the globe is a huge bar magnet, it is reasonable to expect powerful electro-magnetic effects near its poles, and as a matter of fact they are never wanting.

Two characteristics were noteworthy in this result. In the first place, the currents detected in the wires were what is known as positive. M. Planté some years ago showed how to produce something very like the aurora in the laboratory without using an exhausted vessel, but by merely causing the positive and negative wires of his battery to approach gradually a vessel charged with salt water—the sides of the jar being also moistened with the liquid. It was found that he could in this way produce arcs and wreaths, and sinuous lines of light strikingly like the Aurora Polaris; but, curiously enough, only at the positive end. It is significant that it was positive currents which rewarded the Helsingfors professor for his ingenious labours. A second feature was that the spectroscope showed the peculiar lines of the aurora. The spectrum of the aurora is a greenish-yellow line, and if this was recognised as stated there could be little doubt as to the genuineness of the phenomenon. The display lasted only a short time, because doubtless the electric pressure or tension was soon equalised, and, besides, the ice gathered so rapidly on the wires as to render them useless, and even to break them by its weight. As far as it went, however, the experiment appears eminently successful. It affords another illustration, like Wells's examination of the theory of Dew, and some of the elder Herschel's and most of Faraday's researches, how much may be accomplished by the simplest methods rightly directed.

There is still much to be done in the investigation of atmospheric electricity. Those mysterious fireballs known among the Portuguese as "Corpos Santos," and among English sailors as "Composants," are still unexplained; and even the origin of the electricity of a common thunderstorm can scarcely be said to be fully accounted for. It is noticeable that Professor Lemström confirms a remark of Sir Edward Sabine, who spent so many years of his life in making magnetic observations. While at anchor near Skye, he noticed that the "cloud-cap on one of the highest hills was permanently luminous at night, and occasionally gave out flashes like those of the aurora." There can now be little doubt that it was a veritable aurora, though strictly local. Commenting on this and some similar facts, eighteen months ago, Professor Tait, of Edinburgh, said that what was wanted to determine the truth as to the electricity of the air was large-scale experiments, and he recommended that some young physicists, clad in a suit of plate armour for their personal protection should, in the spirit of ancient chivalry, take their stations on the Connemara hills, where striking phenomena are often visible, and with the weapons of modern science, tap the lightning of the clouds and the surcharged electricity of the earth. In the same way as M. Lemström caused an aurora, thunderstorms might be prevented. Reversing the method, a captive balloon could carry into the clouds from a mountain summit the copper wire that would discharge the flash safely to the earth. Fuller, in his "Church History," says: "Scarcely a great abbey exists in England which once at least was not burned down with lightning from heaven." But since abbeys and churches have been protected by lightning-conductors, they have not only not been burned down, but have helped to protect the property near them. Buildings like St. Paul's and the tall spires of village churches built on high grounds, probably discharge many a thundercloud harmlessly in the course of a year. Nor must it be supposed that researches like these of Professor Lemström are merely contributions to theory. It seems not improbable that the laws of electro magnetic disturbance, when fully investigated, will serve to explain climatic changes and irregularities, and there are already meteorologists who look to this quarter for

trustworthy forecasts of storms. A genuine addition to knowledge always brings practical advantages in its train.—*Daily Telegraph*, March 5th.

In *Nature*, for February 1st, we gave a brief account of the remarkable results obtained by Professor Lemström, with his network of wires arranged up the face of the mountain at his station at Sodam-Kylä, in North Finland. By this means he succeeded in procuring an appearance exactly similar to that of the aurora borealis. In connection with these experiments, Mr. G. A. Rowell, assistant in the Natural History Department at Oxford, has issued a circular calling attention to the suggestion made by him forty years ago in reference to similar experiments. "My views on the cause of auroræ," Mr. Rowell states, "are, that they result from electricity carried over with vapour by the superior trade winds, from tropical to polar regions, and its occasional accumulation in the latter to such a degree as to flash back to lower latitudes, through the atmosphere at a reduced density, but still within the regions at which vapour is flotable, although in a frozen condition. The directive properties of the magnetic needle I attribute to the return current of electricity from polar to tropical regions. The following is the concluding paragraph of the report on my paper on this subject:—'The author supports his opinion by general reference to the observations on the aurora, &c., in the appendix to Captain Franklin's 'Journey to the Polar Seas,' and concludes with proposing the experiments of raising electrical conductors to the height of the clouds in the *frigid regions during the frosts in winter*, which in his opinion would cause the aurora to be exhibited, and lead to important discoveries in the science of magnetism."—(*Report* of the British Association, 1840, Sections, 4 p.9.—*Nature*, March 8th, 1883.

THE METEOROLOGICAL SOCIETY.

AT the last monthly meeting of this Society, held on March 21st at the Institution of Civil Engineers, Mr. J. K. Laughton, F.R.G.S., President, in the chair, a paper was read by Dr. H. Cook, F.R.G.S., F.M.S., entitled "Notes on a March to the Hills of Beloochistan, in North-West India, in the months of May to August, 1859, with remarks on the Simoom, and on the Dust Storms." These months may be considered as the summer of the hill country of Beloochistan, though the natives expect the weather to change soon after the fall of rain, which takes place about the end of July and beginning of August. Compared with that of the plains, the climate is delightful. The actual heat is greater than in England, especially the intensity of the sun's rays, but the weather is less variable. Fruits and crops, as a rule, ripen earlier, and are not exposed to the vicissitudes of the English climate. The atmosphere is clear and pure, the air dry and bracing. Dr. Cook describes different kinds of dust storms, and considers that they are due to an excess of atmospheric electricity. With regard to the simoom, which occurs usually during the hot months of June and July, it is sudden in its attack, and is sometimes preceded by a cold current of air. It takes place by night as well as by day, its course being straight and defined, and it burns up and destroys the vitality of both animals and vegetables. It is attended by a well-marked sulphurous odour, and is described as being like the blast of a furnace; and the current of air in which it passes is evidently greatly heated. Dr. Cook believes it to

be a very concentrated form of ozone, generated in the atmosphere by some intensely-marked electrical condition. After the reading of this paper, the Fellows inspected the Exhibition of Meteorological Instruments for Travellers. In addition to the ordinary instruments designed for travellers—viz., barometers, thermometers, hypsometrical apparatus, compasses, artificial horizons, &c., some very interesting historical instruments used by celebrated travellers and explorers were exhibited, including those used by Dr. Livingstone in his last journey; by Commander Cameron, during his journey across Africa; by Sir J. C. Ross, in his Antarctic expedition; by Sir E. Sabine in his Arctic voyage, &c.

MEASUREMENT OF SNOW.

To the Editor of the Meteorological Magazine.

SIR,—During a peculiarly rough winter, which has furnished (1) the heaviest snowstorm (Dec. 4th to 8th) and (2) the greatest flood (Jan. 28th) ever known in this district, the measurement of snow has forced itself on my attention.

My advice is this. Have a board placed in the most sheltered spot you can find, where snow drifts in or out as little as possible. Invert on this the funnel of an 8-inch gauge, or an 8-inch metal ring, and weigh what you catch to a quarter of an ounce. Divide the number of ounces by 29 and you have the fall in inches.

Taking one-twelfth of the fall is (in my opinion) useless. Why, yesterday morning the snow was only 2 in. deep for a fall (caught in the gauge) of 0·36, whereas on Sunday morning the same depth gave only 0·06. Air nearly still in both cases.

But in a really bad storm you are fortunate if by any device you can get within a quarter of an inch of the truth.

F. W. STOW.

Aysgarth Vicarage, March 21st, 1883.

[A letter from Mr. Stow, like a speech from Sir Edmund Beckett, is sure to be worth reading, and almost equally sure to provoke somebody to pugnacity. We are very glad to have Mr. Stow's experience, and to find that it nearly agrees with the rules already laid down. Rule XV., Section 2, says, "Select a place where the snow has not drifted, invert the funnel, and turning it round lift and melt what is enclosed." This differs from Mr. Stow's proposal chiefly in the question of melting *versus* weighing. Each method has advantages and evils; we consider the refinement of $\frac{1}{4}$ oz. = 0·009 in. inconsistent with the last clause of Mr. Stow's letter, and cannot agree to advise that observers should trouble themselves, and increase the risk of a muddle in their calculations, by weighing more closely than to the nearest ounce. Of course, very many observers have only 5 inch funnels, and then they must divide by $11\frac{1}{2}$, not a comfortable divisor for those who have forgotten their school learning.

As regards the rule of one-twelfth, we reprint a letter and our comment* upon it, written nearly twenty years since :—

MEASUREMENT OF SNOW.

"Referring to *British Rainfall*, 1864, p. 5, you give as one of three methods of measuring snow : 'Measure the average depth of snow, and take a twelfth as the equivalent of water.' This differs so widely from the result of my own observation, that I should be very glad to see the results of any direct experiments given on your first page. On a recent occasion, 2in. of snow gave ·37in. of water—that is, about 1 to 5·4.

"W. F. HARRISON, Bartropps, Weybridge Heath.

["My friend's note raises the point very clearly, and I willingly admit the rule to be bad ; but as some observers will not take the trouble to melt the snow, the rule was added to secure uniformity, and the nearest possible approach to accuracy. Obviously, the ratio depends entirely on the density ; and the following experiments in different localities and winters, show that any ratio from one-thirty-fifth to one-fifth may be obtained. I see nothing in the following table to induce me to recommend more than one-twelfth."]

We need not take up space by reprinting the table, it confirms, and so do many which have been given in different volumes of *British Rainfall*, Mr. Stow's statement that the value of a fall of snow may vary, not only from $5\frac{1}{2}$ to 33, as in the cases quoted by Mr. Stow, but from 5 to 35. But we cannot admit that the rule of taking a twelfth is useless, because sometimes one ought to take a fifth and sometimes a thirty-fifth. Take the cases Mr. Stow quotes :—

2 inches = 0·36 ... 1-12th would be 0·17, error 0·19
2 inches = 0·06 ... 1-12th ,, ,, 0·17, error 0·11

No one, we believe, suggests taking 1-12th when any better plan is available, but we have not yet seen evidence to convince us that it is better for a record to be left incomplete, than for it to be completed by the insertion of the result obtained by the rough rule of 1-12th. Until that evidence is produced, we cannot agree with Mr. Stow that the rule is "useless."—ED.]

SCHEME FOR THE OBSERVATION OF THE UPPER CLOUDS.

IN a circular which has nearly the above title, the Rev. W. Clement Ley invites the attention of meteorologists to a system of cloud classification, which, together with instructions on the method of making and telegraphing observations of the higher clouds, he has submitted to his colleagues of the Committee on cirrus observations, nominated in August last by the International Meteorological Committee.

The scheme is itself an abstract of part of a large work on clouds, now nearly ready for publication. In that work the author follows the primary outlines of cloud classification proposed by Luke Howard, dividing the objects of observation into—1st, *Cirriforms*, 2nd, *Cumuliforms*, 3rd, *Stratiforms*, 4th, *Composites* ; while in the sub-division of

British Rainfall, 1865, Appendix p. 7.

these primary types he is induced, by reasons the cogency of which he hopes to demonstrate, to deviate from Howard's classification.

The Note before us is confined to the subject of the cirriforms. As regards these, Mr. Ley writes :—

"I have been, after many years devoted to the consideration of the subject, reluctantly compelled to give up the employment of the two terms, 'Cirro-stratus,' and 'Cirro-cumulus.' Their use has led to endless confusion. In point of structure, the clouds usually called 'Cirro-cumuli' belong essentially to the higher Stratiforms, consisting of nubecules separate, or partly coalescing, occupying a layer of atmosphere of very small vertical thickness, but of very great horizontal extent, and they are not formed in nature by those processes which are productive of clouds either of the cirrus or of the cumulus type. They are, in fact, neither in appearance nor in mode of physical formation, either compounds of cirrus with cumulus, or hybrids between cirrus and cumulus. Therefore, in practice, the use of the word 'cirro-cumulus,' has led to a large number of clouds of no great elevation being classified amongst the cirriforms; a result which was of little consequence when the laws regulating the upper currents of the atmosphere had received no examination, but which must prove absolutely fatal to a scheme based upon those laws, according to which new and most valuable results will be attained. The name 'cirro-stratus' is almost equally objectionable, and for similar reasons. I divide the Cirriforms as follows :—

I.—CIRRUS (Curl-cloud), Cir.
II.—CIRRO-FILUM (Gossamer-cloud,) Cir-fil.
III.—CIRRO-VELUM (Veil-cloud), Cir-vel.
A. var. MAMMATUM (Tubercled Veil-cloud), Cir-vel. Mam.
IV.—CIRRO-NEBULA, (Veil-haze), Cir-neb.
V.—CIRRO-GRANUM (Granular Curl-cloud), Cir-gr.
VI.—PSEUDO-CIRRUS PENDULUS (Brush-cloud), Ps-Pend.
VII.—PSEUDO-CIRRUS FRACTUS (Snow-rack) Ps-fr."

Descriptions of these clouds follow, and symbols are given for employment in written or printed weather reports. Six pages of the "Note" are then devoted to a lucid description of the method of observation and telegraphy which the writer advocates. As regards the results anticipated, Mr. Ley says :—

"It is difficult to estimate the advantages which would be derived from the possession of a staff of observers at outlying stations, who would communicate accurate telegraphic information of the forms of the upper clouds, and of the movements of the upper currents to the head-quarters of the different Meteorological Services. If the observers can be obtained, this scheme will in my own opinion, at once double the value of existing systems of storm-warnings. An isolated observer in the English Midlands is enabled, as I have proved year after year, by observations of the clouds of all classes, but principally, (*i.e.* in the most unsettled weather) by the study of the cirriforms; first, to post up the local weather of the next twenty-four hours, with almost invariable success, being defeated on an average in about eight days in the year. Secondly, to plot out on a map the general distribution of atmospheric pressure, and of weather existing over the whole of the British Isles at the time of his observations, with very considerable accuracy. Thirdly, to form a forecast of the dis-

tribution of atmospheric pressure, and of weather over the British Isles for the next twenty-four hours after the observation, which forecast shall be in a rather large majority of cases correct. Fourthly, to furnish information of coming storms in some instances before any instrumental indication can be telegraphed from the western coast of Ireland. I believe that the addition of a number of cloud observers, properly grouped as regards locality, would be a gain to the Meteorological Service of each country almost comparable to that which a chess player would receive by the augmentation of the number of his pawns."

With this paragraph we are inclined to agree, for we have always held that the reporting of mere readings of barometer, thermometer, &c., does not adequately convey to the Central Office the individualities (if we may so express it) of local weather. But it must not be overlooked that the whole paragraph hangs on six words—"*If the observers can be obtained.*" That is the real difficulty. Are there a dozen men in all Europe who would be as successful as Mr. Ley? Certainly not.

There are also minor difficulties. If Mr. Ley is going to have an equally minute sub-division of Cumuli, Strati, &c., the entire vocabulary will be somewhat alarming to beginners, for if each group is to have eight varieties, and nearly half of them with triple names, such as "Cirro-Velum Mammatum," the duties of a cloud observer will be no joke.

Then there is the grave inconvenience of disturbing an established nomenclature, against which is to be set the fact that with the development of our knowledge of the upper currents, corresponding developments of nomenclature may reasonably be expected, and if they are to be proposed, no man has a greater right to be heard than Mr. Ley.

We may, however, feel sure that the subject will, for some time to come, command considerable attention. Our readers will scarcely need referring to Prof. Poëy's works, *Comment on observe les Nuages*,* and *Les Courants atmosphériques d'après les Nuages au point de vue de la Prévision du temps*,† but we must also call attention to an excellent memoir by M. Weilbach on the forms of cloud in Northern Europe, which has just been published in one of the volumes of the *Annales du Bureau Central Météorologique de France*, and to the extremely good synopsis of the history of cloud nomenclature and classification which M. Weilbach has there given.

OCTOBER, 1882, IN EASTERN RUSSIA.—At Katerinberg (lat. 57° N. Lon., 61° E.) on the east side of the Ural Mountains, the mean temperature for October is 0°·9 C. (33°·6 F.), and the lowest value since 1836 was −3°·2 C. (26°·2 F.) in 1856. For October 1882 the mean was −3°·9 C. (25°·0 F.), being 8°·6 F. below the average. The maximum on 19 days was below freezing point, and minima occurred of −19°·C. (−2°·6 F.) and −17°·9 C. (−0°·2 F.). Katerinberg is not a very high station, its altitude being only 886 feet above sea level.

* See *Met. Mag.* vol. xv. (1880) p. 2. † See *Met. Mag.* vol. xvii. (1882) p. 99.

BALL LIGHTNING.

To the Editor of the Meteorological Magazine.

SIR,—Referring to the recent review in the *Times* of Mr. Scott's "Elementary Meteorology," in which "globular lightning" is said to be so rare that some physicists "deny the possibility of its existence," I beg to append an authentic record of a case. Major J. R. Molineux, of Brook House, Compton, near Guildford, in a letter to me this day quotes from his journal under date July 12th, 1868:—"Heavy rain and storm during the day. Evening, about 8, the storm renewed; forked flashes on dark clouds, very grand, particularly one from a centre of fire. About 9, when I was in the library with the shutters closed, seated by a lamp, intent on a book, the storm having apparently receded, a gleam of electric light, the brightest I ever saw, seemed to pour into the room through the chinks, instantly succeeded by a crash of thunder. Cry from my wife in the room above. She thought she had been struck. She saw a ball of fire fall, apparently close to the window. It was the size of my sponge bath, about 3 ft. in diameter. My son, passing under a skylight, saw the fall of lightning. He, too, thought it had struck him. The rain then fell in torrents. The next morning I examined the garden, and found the only damage done was that a hole or jagged trench, about 8 in. deep, and 8 or 10 ft. long, had been made in the gravel, near the kitchen chimney.

I remember the lightning, when the ball fell, was so bright as to make the room seem dark after its retreat, although I had a good reading lamp by my side; and it seemed to blaze and quiver on the wires of two large bookcases opposite me. An old labouring man, named Stovold, told me afterwards he was passing by the common near my house at the time, and that when the lightning fell, he thought he was 'set afire by the blaze.' My wife, I may add, had never even heard of such a form of lightning before."

The above account may certainly be depended upon, and was given to me in conversation previously.

I am, Sir, your obedient Servant,

J. RAND CAPRON, F.M.S.

[Mr. Rand Capron does not seem to have quite realized the distinguishing and puzzling feature of "Ball Lightning"; at any rate the above case is by no means so difficult to explain as the very good illustrations quoted by Mr. Scott. There is nothing in the above account to indicate slowness of motion except that the flash produced on the retina of two persons the impression of a ball of fire, but probably half a second would do that. Mr. Scott's definition is perfect. He says, "It manifests itself as a luminous sphere, varying in diameter from a few inches to even two or three feet. It moves very slowly, and remains visible for several seconds, or even minutes, generally at last exploding with great violence."

The *Report of the Lightning Rod Conference** dealt with lightning rods rather than with lightning, but several references to ball lightning

* Spon, Charing Cross, 1882.

will be found in it. Among others the following abstract of a very interesting French memoir :—"Le Coup de Foudre de l'Ile du Rhin pres de Strasbourg," par M. F. Hugueny :—

A very full account of an accident by ball lightning. The facts are set out as clearly as possible, the authority is given for every statement, and there are most carefully engraved plans and engravings of all the necessary details. It does not bear upon the question of lightning conductors except in that it shows that a discharge of globular lightning traversed a horizontal distance of 919 yards, passed in front, but below the top, of a building which had three good conductors upon it, and struck a chestnut tree, which was by no means the highest tree in the locality.

We make one other quotation from this report—viz., on the very high authority of Professor Tait :—

"Fireball or globe lightning undoubtedly exists, and is probably due to a species of natural Leyden jar, very highly charged, which no lightning rod can destroy, except, perhaps, a close network of stout copper wires."

A very careful paper upon the subject by Cromwell F. Varley, F.R.S., will be found in the *Phil. Trans.* 1871, and that electrician has actually produced the effect experimentally, of course, upon a small scale.

We may also refer those interested in the subject to the paper upon "Lightning and Lightning Conductors" read by W. H. Preece, C.E., F.R.S., before the Soc. Telegraph Engineers in 1872, and reported, together with the discussion, in Vol. I. of their Journal.

EXTRAORDINARY WAVE IN THE CHANNEL.

The Weymouth and Channel Islands Steam Packet Company's mail steamer *Aquila* left Weymouth at midnight on Friday for Guernsey and Jersey. On her passage across Channel, the weather was calm and clear, and the sea was smooth. When about one hour out, 1 a.m., 31st March, 1883, the steamer was struck violently by mountainous seas, which sent her on her beam ends and swept her decks from stem to stern. The water immediately flooded the cabins and engine room, entering through the skylights, the thick glass of which was smashed. As the decks became clear of water, the bulwarks were found to be broken in several places, one of the paddle boxes was considerably damaged, the iron rail on the bridge was completely twisted, the pump was broken and rendered useless, the skylight of the ladies' cabin was completely gone, and the saloon skylight was smashed to atoms. The cabins were baled out with buckets, while tarpaulins were placed over the skylights for protection. Five minutes after the waves had struck the steamer, the sea became perfectly calm. Several of the crew were knocked about, but no one was seriously injured.

[This paragraph embodies the substance of the reports published in the English and French newspapers, generally under the heading of "Tidal Wave in the Channel." We think that the phenomenon was more probably due to an earthquake wave, but enquiries are in progress, and if any important facts are elicited they will be given next month.—ED.]

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, NOV., 1882.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Maximum. Date.	Minimum. Temp.	Minimum. Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0–100	°	°	inches		
England, London	61·8	5	25·4	18	49·4	38·2	37·5	78	91·8	23·3	2·57	18	5·9
Cape of Good Hope	...	...	...	...	...	...	...	...	...	...	...	...	...
Mauritius	81·5	28*	69·2	12	80·0	71·5	64·4	69	...	...	·74	12	5·4
Calcutta	86·6	2	61·2	17†	81·2	66·9	65·1	76	150·5	47·1	1·61	2	3·5
Madras	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay	90·3	16‡	67·2	6	85·1	70·9	67·6	70	144·2	57·3	·03	2	2·1
Ceylon	88·8	19	72·3	23	86·2	74·7	71·5	74	154·0	67·3	11·58	10	6·1
Melbourne	96·6	9	42·6	1§	72·1	51·6	49·1	67	154·0	35·7	3·31	7	5·4
Adelaide	101·3	8	43·7	1	82·7	56·1	50·6	51	161·2	35·3	·90	8	4·1
Wellington	79·0	24	41·9	12	63·5	48·5	...	...	139·0	40·0	4·33	11	...
Auckland	76·5	23	42·1	9	66·5	51·9	50·3	73	131·5	38·2	1·95	15	6·9
Falkland Isles	59·3	19	35·2	1	53·7	39·7	41·7	77	126·0	30·0	2·75	18	7·2
Jamaica	89·3	2	65·4	20	86·4	69 9	68·5	76	...	58·5	1·29	4	4·3
Barbados	84·0	3	68·0	13	80·0	73·0	73·4	85	146·0	66·0	8·93	26	6·0
Toronto	64·2	11	7·2	28	41·6	29·4	31·7	76	124·0	5·0	2·15	16	7·4
New Brunswick, S. John	62·0	1	18·0	29‖	39·8	28·7	29·9	80	...	...	2·30	12	6·5
Cape Breton, Sydney	60·0	1	23·9	8	42·4	32·2	32·6	82	...	...	5·58	15	7·0
Manitoba, Winnipeg	40·9	6	–11·1	24	27·7	11·9	19·6	79	99·0	...	0·91	8	6·6
British Columbia	...	...	...	...	...	...	...	...	...	...	...	...	...

* And 30. † And 19, 21. ‡ And 20. § And 4. ‖ And 30.

REMARKS, NOVEMBER, 1882.

Mauritius.—Rainfall 1·61 in. below average; mean temp. 0°·2 above it; mean pressure, 30·064 in.; mean hourly velocity of wind 10·5 miles, extremes 25·9 miles and 2·2 miles; prevailing direction E.S.E. to E.N.E. C. MELDRUM, F.R.S.

Melbourne.—Mean pressure slightly, and mean temp. 1°·2 above the average; humidity about the average, amount of cloud below it; rainfall 1·46 in. above it; prevailing direction of wind S., strong breezes occurring on six days; heavy dew on three days; L on three days, T and L on 22nd, with H; Aurora Australis on 17th and 20th. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean pressure (29·985 in). ·100 in. above the average; mean temp. (69°·4) 2°·7 above it. Rainfall slightly below the average. Heavy R and terrific TSS traversed that portion of the continent S. of lat. 27° apparently moving in a S.E. direction; the north pastoral districts recording the heaviest downpours, nearly 4 inches at many places, and with the exception the of S.E. portion of this colony, the fall was in excess of previous years. In Central Australia it reached the mean, but towards the N. coast, it was very heavy, some stations recording over 7 and 8 inches. C. TODD.

Wellington.—First three days fine, then unsettled till 9th, with heavy R and T on 8th; the remainder of the month was generally fine, with the exception of two short wet periods, 14th to 16th, and 25th to 27th. Prevailing winds N.W. and S.E. generally moderate, but strong on 7th; earthquakes on 18th and 25th; Auroræ on 17th and 20th. R. B. GORE.

Auckland.—Weather mostly cloudy, especially in the first half of the month. Rainfall small, and in slight showers, except a heavy fall on 4th; wind strong, chiefly S.W.; pressure high, mean 30·189 in. Fine aurora on 21st, with rapid fall of bar. ensuing. E. B. DICKSON.

Falkland Isles.—Heavy H showers on 24th and 25th. F. E. COBB.

BARBADOS.—Mean temp. 76° 3, the same as the average; average velocity of wind 7·8 miles per hour, extremes 15·9 miles and 1·5 miles; rainfall 9 per cent. above the average; evaporation the same as the average; nine days were overcast; T SS on 3rd, 11th, and 12th. R. BOWIE WALCOTT.

SUPPLEMENTARY TABLE OF RAINFALL,

MARCH, 1883.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger	1·35	XI.	Llanfrechfa Grange	·94
,,	Margate, Birchington...	1·04	,,	Llandovery	2·18
,,	Littlehampton	·51	,,	Solva	·91
,,	St. Leonards	1·20	,,	Castle Malgwyn	2·97
,,	Hailsham	1·09	,,	Rhayader, Nantgwillt..	2·83
,,	I. of W., St. Lawrence.	·78	,,	Carno, Tybritle	1·51
,,	Alton, Ashdell.....	1·21	,,	Corwen, Rhug	2·44
III.	Great Missenden.....	1·06	,,	Port Madoc	2·92
,,	Winslow, Addington ...	1·06	,,	I. of Man, Douglas	1·32
,,	Oxford, Magdalen Col...	·99	XII.	Carsphairn	3·59
,,	Northampton	1·15	,,	Melrose, Abbey Gate...	2·68
,,	Cambridge, Beech Ho...	·79	XIII.	N. Esk Res. [Penicuick]	1·95
IV.	Southend	·65	XIV.	Ayr, Cassillis House ..	1·56
,,	Harlow, Sheering	1·00	,,	Glasgow, Queen's Park.	1·25
,,	Diss	1·93	XV.	Islay, Gruinart School..	1·88
,,	Swaffham	1·72	XVI.	St. Andrews, Newton Bk	1·29
,,	Hindringham	1·76	,,	Aberfeldy H.R.S.	2·98
V.	Salisbury, Alderbury...	1·12	,,	Dalnaspidal	3·23
,,	Warminster	1·70	XVII.	Keith H.R.S.	2·28
,,	Calne, Compton Bassett	1·12	XVIII.	Forres H.R.S.	1·85
,,	Beaminster Vicarage ...	1·69	,,	Strome Ferry H.R.S....	4·18
,,	Ashburton, Holne Vic..	2·94	,,	Lochbroom	2·33
,,	Torrington, Langtree W.	1·06	,,	Tain, Springfield.....	1·41
,,	Lynmouth, Glenthorne.	1·36	,,	Loch Shiel, Glenaladale	4·45
,,	Probus, Lamellyn	2·26	XIX.	Lairg H.R.S.	2·44
,,	Taunton, Fullands	·53	,,	Forsinard H.R.S.	3·84
VI.	Bristol, Clifton	·95	,,	Watten H.R.S.	2·20
,,	Ross	·92	XX.	Fermoy, Glenville	1·96
,,	Wem, Sansaw Hall.....	...	,,	Tralee, Castlemorris ...	1·64
,,	Cheadle, The Heath Ho.	1·19	,,	Tipperary, Henry Street	1·14
,,	Worcester, Diglis Lock	1·05	,,	Newcastle West	·82
,,	Coventry, Coundon	1·14	,,	Kilrush	...
VII.	Melton, Coston	1·20	,,	Corofin	1·18
,,	Ketton Hall [Stamford]	·95	XXI.	Carlow, Browne's Hill..	1·70
,,	Horncastle, Bucknall ...	1·29	,,	Navan, Balrath	1·03
,,	Mansfield, Market Place	1·51	,,	Athlone, Twyford	·92
VIII.	Macclesfield, The Park.	·91	XXII.	Mullingar, Belvedere ...	1·01
,,	Walton-on-the-Hill.....	1·09	,,	Clifden, Kylemore	3·59
,,	Lancaster, South Road.	1·04	,,	Crossmolina, Enniscoe..	2·37
,,	Broughton-in-Furness ..	...	XXIII.	Carrick-on-Shannon ...	·36
IX.	Wakefield, Stanley Vic.	1·09	,,	Dowra	...
,,	Ripon, Mickley	1·91	,,	Rockcorry.....	1·12
,,	Scarborough.....	1·78	,,	Warrenpoint	2·06
,,	East Layton [Darlington]	...	,,	Newtownards	1·27
,,	Middleton, Mickleton ..	2·19	,,	Belfast, New Barnsley..	1·56
X.	Haltwhistle, Unthank..	1·17	,,	Bushmills	1·33
,,	Shap, Copy Hill	3·67	,,	Buncrana	2·54

MARCH, 1883.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1870–9	Greatest Fall in 24 hours. Dpth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32°. In shade.	On grass.
			inches	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	·86	— ·75	·29	19	11	57·0	31	22·4	24	21	25
II.		Maidstone (Hunton Court)...	1·35	— ·23	·27	18	14	...	...	...	...	...	...
,,		Strathfield Turgiss	·73	— ·67	·36	19	6	56·2	5	13·8	24	25	27
III.		Hitchin	·75	— ·73	·28	19	13	51·0	30*a*	17·0	23	27	...
,,		Banbury	1·24	— ·36	·51	19	15	54·0	30	18·0	10	27	...
IV.		Bury St. Edmunds (Culford)	1·88	+ ·32	·56	7	15	53·0	31	15·0	9	26	...
,,		Norwich (Cossey)	1·95	+ ·26	·23	19	18	54·0	31	17·0	10	24	24
V.		Bridport	1·12	...	·40	29	8	...	...	...	...	...	...
,,		Barnstaple.....	·98	— 1·51	·18	26	10	56·0	6	23·0	16	...	...
,,		Bodmin	1·88	— 1·28	·57	29	15	53·0	5	21·0	24	15	27
VI.		Cirencester	2·11	+ ·04	·85	26	7	...	...	...	...	...	...
,,		ChurchStretton(Woolstaston)	1·14	— 1·02	·41	19	13	52·0	30*a*	19·0	9, 10	25	28
,,		Tenbury (Orleton)	1·38	— ·49	·47	19	18	57·0	5	16·3	10	24	28
VII.		Leicester	·95	...	·36	19	13	55·0	30*a*	16·0	10	24	25
,,		Boston	1·37	+ ·08	·33	19	12	55·0	5	18·0	10	22	...
,,		Grimsby (Killingholme).....	1·56	— ·10	·32	19	18	53·0	30	21·0	10	20	...
,,		Hesley Hall [Tickhill].....	1·16	...	·36	19	11	58·0	4	7·0	9	25	...
VIII.		Manchester (Ardwick).....	1·19	— 1·26	·42	20	10	51·0	30	21·0	10	21	...
IX.		Wetherby (Ribston Hall) ...	1·64	— ·49	·54	8	10	...	...	...	...	...	...
,,		Skipton (Arncliffe)	2·40	— 2·36	·82	29	11	58·0	4	18·0	9	...	...
X.		North Shields	2·14	+ ·69	·43	7	19	54·8	5	22·8	10*b*	25	26
,,		Borrowdale (Seathwaite).....	6·77	— 3·12	3·95	29	9	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	·63	— 2·06	·16	25	9	...	...	...	...	...	...
,,		Haverfordwest	1·94	— 1·25	·98	29	14	52·0	1	18·4	9	20	27
,,		Plinlimmon (Cwmsymlog) ...	1·95	...	·44	29	11	...	...	...	..	...	...
,,		Llandudno.....	1·73	— ·15	·45	29	13	52·8	3	26·0	24	12	...
XII.	SCOTLAND.	Cargen [Dumfries]	2·14	— ·64	1·36	29	6	51·8	2	23·2	17	23	...
,,		Hawick	1·91	— ·05	·59	29	13	...	...	..	...	...	...
XIV.		Douglas Castle (Newmains)	2·74	— ·40	1·30	29	6	...	...	...	...	...	...
XV.		Lochgilphead (Kilmory).....	...	...	...	...	...	...	...	20·0	27	24	...
,,		Appin (Airds)	1·40	...	...	...	...	...	...	...	...	...	.
,,		Mull (Quinish).....	2·10	...	1·03	30	16	...	...	...	...	...	...
XVI.		Loch Leven Sluices	1·20	— ·92	·50	20	7	...	...	...	...	...	...
,,		Arbroath	1·97	+ ·34	·46	29	16	52·0	5	24·0	15	20	...
XVII.		Braemar	3·26	+ 1·07	1·00	29	21	61·0	2	6·0	23	29	31
,,		Aberdeen	3·84	...	·53	25	25	55·0	2	23·0	26	20	...
XVIII		Skye (Sligachan)	7·48	...	5·50	30	21	...	...	...	...	...	...
,,		Culloden	1·52	— ·23	...	...	...	57·0	1	23·0	23	18	29
XIX.		Dunrobin	2·12	...	·30	17	19	58·5	1	21·5	23	19	...
,,		Orkney (Sandwick).....	2·56	— ·08	·64	18	25	47·0	2,5	26·8	6	18	24
XX.	IRELAND.	Cork (Blackrock)	2·24	— ·52	1·56	29	13	58·0	1	22·0	23	19	...
,,		Dromore Castle	2·52	...	·70	29	14	65·0	1	25·0	23	12	...
,,		Waterford (Brook Lodge) ...	1·67	...	·95	29	13	55·0	1,5	23·0	24	16	...
,,		Killaloe	·89	...	·28	29	13	60·0	4	20·0	24	15	...
XXI.		Portarlington	·98	— 1·18	·35	29	16	51·5	5	23·0	23	24	...
,,		Dublin (FitzWilliam Square)	1·06	— ·67	·46	20	12	51·5	1	25·4	24	16	19
XXII.		Ballinasloe	·92	— 1·46	·47	29	12	49·0	1	24·0	9	23	...
XIII.		Waringstown	1·46	— ·60	·73	29	10	55·0	1,4	20·0	14*c*	23	23
,,		Londonderry (Creggan Res.).	2·85	...	·68	29	20	...	...	...	...	...	...
,,		Omagh (Edenfel)	1·97	— ·12	·53	29	20	50·0	1,2	20·0	26	25	...

+ Shows that the fall was above the average; — that it was below it.

a And 31. *b* And 17, 28. *c* And 26.

METEOROLOGICAL NOTES ON MARCH.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

STRATHFIELD TURGISS.—March was fine but cold, with searching E. winds and severe frosts at night, which, however, did not penetrate much below the surface. The land is now seeded in a far more efficient way than would have been possible without the frost. Peacock butterfly seen on the 1st, thrushes nest with three eggs on 7th, wasp on 30th. Narcissus in flower on 10th; coltsfoot on 16th.

HITCHIN.—Mean temp. of the month unprecedentedly low (32°·9) 6°·6 below the average of 30 years, and ten degrees below that of March, 1882.

BANBURY.—A very cold month, but favourable to farmers; mean temp. 35°·2, 5° below the average; high wind on six days; S on twelve days. Parhelia seen on 8th.

CULFORD.—A thorough winter month, very distressing to vegetation. S. on seven days.

COSSEY.—A very cold month; more or less S about under the fences, from 6th to 30th. Meadows quite brown, not a shade of green on them, and many fields of wheat scarcely visible. Max. temp. on 22nd, only 33°.

BODMIN.—A very remarkable cold March; mean temp. 37°·7, 5°·4 below that January. Min. temp. on grass 12° on 24th. S on five days. H on three days.

CIRENCESTER.—A dry cold month, the first month with rainfall below the average for a long time.

WOOLSTASTON.—A month of unprecedented severity, the mean temp. being only 35°·0, and the mean min. 28°·3. S on eight days; strong gale on 28th.

ORLETON, TENBURY.—The coldest March since 1845, only three nights without frost. Mean temp. more than 5° below the average of 20 years, and nearly 1° below that of March, 1867. The temp. of the first six days was about the average, but it then became very cold, with severe frosts, which continued till the end of the month. There were frequent light falls of S, and very strong and intensely cold winds between the 19th and 25th. Rainfall much below the average, and less cloud than usual The effects of the drying wind upon the land was very favourable, but fruit trees and all vegetation were checked. S on 14 days.

LEICESTER.—A very cold month; four inches of S on the ground on 8th.

BOSTON.—Nearly the whole of the precipitation was in the form of S, which fell on ten days The temp. was exceedingly low, and the weather bitterly cold; on the 10th, the temp. fell to 18°0, the lowest recorded in March since 1872. On the 24th, the temp. suddenly rose in the middle of the day from freezing, to 46°, and then as suddenly fell again, the night temp. being 23°, this warm wave lasted about two or three hours. On the 11th, the tide rose higher than it had done since 1820, to 17 ft. 7 in. above ordinance datum, or 4 ft. 3 in. above an ordinary spring-tide, causing great damage to the sea banks, and inundating the lower part of the town; this extraordinary height was due to the very strong gales which had been blowing for several days from N.E. and N.W., coming at the same time as the spring equinoctial tides. The frosts and drying winds, although putting everything very backward, wonderfully improved the condition of the land, and made it in good order for working the spring sowing.

GRIMSBY, KILLINGHOLME.—A month of unusual cold and strong gales, but the frost greatly benefited the heavy lands. Terrible loss of life and property in the fishing fleet, from the Humber ports. Gale on the 6th; remarkably high tide in the Humber on 10th. S on 11 days.

HESLEY HALL, TICKHILL.—Mean temp. of the month 35°·4.

NORTH SHIELDS.—S on 17 days.

WALES.

HAVERFORDWEST.—The month commenced with a falling temp., the cold gradually increasing in severity, very low day and night temperatures were registered, and large sheets of water were frozen over, and the banks of the river presented quite an Arctic appearance on several mornings, fields of ice forming after the recession of the tide. S fell in considerable quantities on eight days, and the high lands were white for some days. The exceptional temperature of 18°·4, 19°·0, 22°·0 and 25°·0 were registered on different days, being the lowest recorded in March, since 1866; and on grass the min. fell to 10°·0 on the 9th. Arable lands in splendid condition after the frost. Mean temp. of the month 37°·4, being the lowest in March during 36 years, wind mostly from E., blowing very hard at times.

LLANDUDNO.—Notwithstanding some fine bright days, particularly at the beginning and near the end of the month, the weather generally was cold and stormy, with frequent showers of H and S, which, however, did not lie except on the distant hills. Mean temp. no less than 5°·7 below the average, but the frost was not of any great severity, except on one night. There was an unusual prevalence of E. and N. winds, which were very strong from the 6th to 8th inclusive. Duration of bright sunshine 102·4 hours.

SCOTLAND.

CARGEN.—The coldest March since observations were commenced 24 years ago; mean temp. 36°·3, 5°·0 below the average; the next coldest March was in 1867, when the mean temp. was 37°·2. N. and E. winds prevailed on 27 days; mean pressure ·175 in. above the average; sunshine about the average. Occasional S showers.

HAWICK.—The most frosty and snowy March ever remembered; out-door work at a standstill from 7th to 29th. S on 10 days.

ABERDEEN.—Cold and stormy throughout; temp. low, and rainfall greatly in excess of the average. Aurora seen on three nights; T and L on the night of 17th; hard gale on 29th. S on 19 days.

CULLODEN.—A cold month; heavy snowfall during the last week. Farm-work considerably in arrear, owing to continued night frosts.

SLIGACHAN.—The first five days were mild, but the remainder of the month was very cold, although frequently bright. Prevailing winds N. and N.E. frequently strong. During the 29th, and early morning of the 30th, a severe storm of wind and R occurred, 5·50 inches falling in 24 hours. Frost on 13 nights; S on 19 days.

SANDWICK.—March was unusually cold and stormy, with a rainfall below the average, being mostly in the form of S. The ground was white with S on 14 days, but generally it was thawed by the sun. Snow rollers were formed on 18th. There were gales of fifty miles an hour on 18th, 24th, 30th, and of fifty to sixty miles on 5th, 6th, and 29th. Aurora on 27th.

DROMORE CASTLE.—The early days of the month were fine and mild, succeeded by cold winds, hailstorms, and sometimes S, which stopped vegetation. The month nevertheless was, on the whole, favourable for tillage operations.

IRELAND.

WATERFORD, BROOK LODGE.—The month generally was dry, but there were slight showers of S on several days; prevailing winds N.E. to E.; rainfall about ·75 in. below average.

KILLALOE.—A bright and very cold month, frequent sharp frosts, and mean temp. unusually low (41°·5). In a record of 37 years March, 1883, occupies third place for lowest rainfall, the first and second places being taken by March 1850, ·54 in., March 1856, ·71 in.; S on 11 days.

DUBLIN, FITZWILLIAM SQUARE.—An intensely cold and dry month, with constant polar winds and frequent showers of H, sleet and S; mean temp. (38°·2) slightly below that of the memorably inclement March of 1867, and

nearly 5° below the average of 18 years. It was also 5° below the mean of January and February, 1883. T on 15th, L on 27th, air foggy on 4 days, solar halo seen on 28th, S or sleet fell on 10 days, and H on 12 days.

BALLINASLOE.—A very harsh and cold month, strong N. to E. wind prevailing; vegetation utterly checked; S on 6 days.

WARINGSTOWN.—A most favourable month for preparing land for spring crops, the drying wind, slight falls of S, and the effects of the sharp frosts on ploughed land, combined in a most unusual way to pulverise and mellow even the stiffest soil. S on 6 days.

CREGGAN RES.—The month was stormy and very cold. S on 10 days.

EDENFEL.—With the exception of the first few days the weather of the month was extremely inclement. Farm labour very backward.

FOG GAUGES.

WE have received from Mr. Ormerod of Teignmonth a letter and some photographs bearing upon the above subject. As we are this month very short of space we are obliged to give merely the following abstract of the letter. Mr. Ormerod approves of the general plan and dimensions suggested in our last number, but has substituted a strip of zinc for the board, as he thinks that the metal will stand the weather better; he has put the numbers by the side of the lines instead of above them, as he considers that it makes it more compact. This alteration we do not admire: when a figure is *between* two stripes there is always liability to apply it to the wrong one, and unless the figures are very large they will not be readable in a dense fog. Lastly, he has mounted it on the top of his Stevenson screen, to which it fits extremely well. Mr. Ormerod considers that the name of Fog Gauge will have to be adopted, as the only other that he can think of is Zophoscope from Ζόφος, darkness or gloom; but we do not want to measure darkness, but opaqueness.

ERRATA IN METEOROLOGICAL MAGAZINE, 1882.

ON comparing the returns supplied to us monthly for publication, with those received for the whole year, many differences have been detected, and correspondence is in every instance opened with the observer. The result has been much worse than usual, for fourteen observers state that their monthly reports have been wrong. Hence the following corrections:—

REGULAR TABLE.

Ribstone, September, should be	1·45	Haverfordwest, Feb., should be	4·49
Haverfordwest, Jan. ,, ,,	6·81	Waringstown, Aug. ,, ,,	3·51

SUPPLEMENTARY TABLE.

Abinger, November, should be	3·07	Ripon, December, should be	3·06
Alton, February, ,, ,,	2·59	Dowra, February, ,, ,,	1·91
Taunton, January, ,, ,,	1·51	,, March, ,, ,,	4·09
,, March, ,, ,,	1·08	,, April, ,, ,,	2·27
Sansaw, October, ,, ,,	4·32	Rockcorry, March, ,, ,,	3·80
Cheadle, May, ,, ,,	2·82	Warrenpoint, April ,, ,,	5·38
Coundon, September ,, ,,	2·85	Buncrana, Sept. ,, ,,	5·33